

Year 2002 PALS

Dear Course Participant:

Enclosed is a Pre-Test for the Pediatric Advanced Life Support class that you have registered for. The American Heart Association has recently changed the way this course is being taught, and it is imperative that you take this test **PRIOR** to attending the class.

You will be asked to turn in the test upon your arrival at the course. If you have not completed it, you will be excused from the class. The information needed to answer the questions is in your text, so please study the book prior to the course dates. The only changes in the new curriculum are listed on the additional handout sheet included with your pre-test. PALS has not had as many changes as BLS and ACLS have, but the layout of the course is completely new, and will require more preparation on the part of the student before the course.

If you have any questions about this information, please feel free to contact me at 301-948-4940 or by pager at 301-517-6981.

Sincerely,

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Program Coordinator for PALS
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Update of PALS Textbook

Note: This information can also be downloaded from the AHA ECC website-. www.cpr-ecc.org.

The following is a summary of science changes since the 1997 printing of the *PALS Textbook*. For reference, the corresponding pages in the *ECC Guidelines 2000* appear in parentheses.

1997 Text Chapter 1: Emergency Medical Services for Children

(*ECC Guidelines 2000*, pages 258-296)

The guidelines reconfirm the need for and encourage the continuation of specialized training and equipment for treatment of the pediatric population.

1997 Text Chapter 2: Recognition of Respiratory Failure and Shock

(*ECC Guidelines 2000*, pages 256-259, 295)

In children the survival rate from out-of-hospital cardiac arrest averages 7% to 11 %, with most survivors neurologically impaired. The goals of pediatric advanced life support must include prevention of injury, illness, and cardiac arrest. Early recognition and treatment of respiratory failure and shock are important to prevent progression to cardiac arrest. PALS treatment of prearrest and arrest conditions must also include identification and treatment of special resuscitation circumstances, including potentially reversible causes of arrest. The major guidelines changes are

Indications for lone rescuers to "phone first" for victims of apparent sudden collapse/cardiac arrest versus "phone fast" for other infant and child victims and any victim with collapse likely to be associated with respiratory arrest (pages 253, 256-257, 294-295)

Renewed emphasis on the need to identify and treat reversible causes of cardiac arrest and symptomatic arrhythmias, such as hypoxemia, hypovolemia, hypothermia, toxic drug overdose, or electrolyte imbalances. Providers may need to alter resuscitation priorities or treatment approaches to some special resuscitation circumstances (pages 322-325; trauma pages 279, 321-322; toxicology, pages 322-325; electrical injury, page 250; hypothermia, page 229; near-drowning, pages 233, 260, 279, 325-326; asthma, page 237; anaphylactic shock, page 241).

1997 Text Chapter 3: Pediatric Basic Life Support

(*ECC Guidelines 2000*, pages 253-290)

Prevention and early intervention are the key to decreasing mortality in the pediatric population. One essential component of this goal is simplification of teaching basic CPR skills to the largest group of responders-lay rescuers. Major guidelines changes in PBLS are

Simplification of maneuvers for lay rescuer relief of foreign-body airway obstruction in an unresponsive victim of any age (pages 277-279)

- Recommendation that the pulse check *not* be taught to lay rescuers; instead lay rescuers should check for other signs of circulation (normal breathing, movement, response to stimulation) to detect cardiac arrest. Healthcare providers, however, should check for signs of circulation, including a pulse, to detect cardiac arrest (pages 269-271)
- Mouth-to-nose rescue breathing as an acceptable alternative to mouth-to-mouth or mouth-to-nose-and-mouth breathing for infants (pages 265-266)
- Requirement that bag-mask ventilation must be mastered by all healthcare providers in all BLS and AMLS courses (pages 267-269)
- Healthcare providers should learn when and how to apply cricoid pressure during bag-mask ventilation of the unresponsive victim (pages 266, 268)
- Use of the 2 thumb-encircling hands technique as the preferred technique for 2-rescuer healthcare provider infant chest compressions (page 273)
- Change in compression-ventilation ratio to 15-2 for children 8 years of age and older for 1 - or 2-rescuer CPR until the airway is secure. After the airway is secure, compressions and ventilations may be asynchronous (page 274)
- Compression-only CPR may be considered for dispatch-assisted CPR and is "better than nothing" when lay rescuers are unwilling or unable to perform mouth-to-mouth rescue breathing (pages 275-276)

1997 Text Chapter 4: Airway and Ventilation

(ECC Guidelines 2000, pages 296-304)

Respiratory problems are the most common cause of pediatric arrest. In addition to guidelines changes in basic airway management, changes in advanced airway management are

- Emphasis on effective bag-mask ventilation versus tracheal intubation by healthcare providers, especially in the out-of-hospital setting with short transport times and providers inexperienced in pediatric intubation (pages 296-297)
- Recommendations for secondary confirmation of tracheal tube placement (pages 301-303)
- Use of alternative advanced airway adjuncts (eg, laryngeal mask airway) by appropriately trained providers (pages 297-298)

1997 Text Chapter 5: Vascular Access

(ECC Guidelines 2000, page 305)

Guidelines changes dealing with establishment of vascular access are

- No upper age limit for use of intraosseous access (pages 305-306)
- Intraosseous access is acceptable and recommended if vascular access is not obtained within a reasonable time: less than approximately 90 seconds in cardiac arrest, more flexibility if the patient is stable (pages 305-306)

1997 Text Chapter 6: Fluid Therapy and Medications

(ECC Guidelines 2000, pages 305-333)

To date no single pharmacotherapeutic agent has been demonstrated in an evidence-based manner to improve survival to hospital discharge with intact neurologic function.

- Emphasis on rapid length-based estimate of drug dosage and estimated appropriate adjunct size (page 306)
- Dextrose solutions should *not* routinely be used for initial fluid resuscitation (to avoid hyperglycemia) (pages 306-307)
- De-emphasis of high-dose epinephrine and considerations for exceptions in special resuscitation circumstances such as septic shock, anaphylaxis, or catecholamine-receptor blocker overdose (page 307)
- Although vasopressin is an alternative vasopressor in the treatment of *adult* shock-refractory VF, there is inadequate data to evaluate its efficacy and safety in infants and children (pages 307, 309, 319)
- Magnesium sulfate as possible treatment in acute asthma and torsades de pointes VT (pages 309-310)

1997 Text Chapter 7: Cardiac Rhythm Disturbances

(ECC Guidelines 2000, pages 307-320)

Primary cardiac events are uncommon in the general pediatric population but may occur more often in special resuscitation circumstances involving the high-risk infant or adolescent. Continuous ECG monitoring of critically ill or injured children is useful. Guidelines changes in this area are

- Indications for use of amiodarone in the treatment of supraventricular and ventricular tachycardia (VT) and ventricular fibrillation/pulseless VT (pages 314-318)
- Decreased reliance on lidocaine for symptomatic wide-complex arrhythmias (pages 314-319)
- Use of procainamide in tachyarrhythmias (pages 314-319)
- Avoidance of combining medications that may prolong the QT interval (eg, procainamide plus amiodarone) (pages 314-319)
- Elimination of bretylium from the VF/pulseless VT treatment algorithm (page 318)
- Introduction of vagal maneuvers into the treatment algorithms for supraventricular tachycardia (pages 314-315), particularly in stable patients
- AEDs may be considered for use in children 8 years of age and older (weighing more than approximately 25 kg) in prehospital cardiac arrest (page 320)

1997 Text Chapter 8: Trauma Resuscitation

(ECC Guidelines 2000, pages 279, 321-322)

The principles of resuscitation of the seriously injured child are the same as those for any other child requiring PALS. Some aspects of pediatric trauma care require emphasis, including

- Importance of primary/initial survey, including ABCs plus D(isability) and E(xposure) (pages 321-322)
- Spinal immobilization techniques (pages 279, 321-322)
- Emphasis on exhaled CO₂ monitoring to confirm proper tracheal tube placement (page 322)
- Avoidance of routine hyperventilation for patients with head trauma (page 322)
- Avoidance of fever/hyperthermia after trauma or cardiac arrest (pages 330, 331)

1997 Text Chapter 9: Resuscitation of the Newly Born

(ECC Guidelines 2000, pages 343-355)

The term *newly born* refers specifically to the first minutes to hours after birth. The term *neonate* applies to an infant in the first 28 days of life. Major guidelines changes for this population are as follows:

- Revised interventions for neonates with meconium-stained amniotic fluid. There is evidence that tracheal suctioning of the vigorous infant with meconium-stained fluid does not improve outcome and may cause complications (page 348)
- Simplified indications for chest compressions based on heart rate less than 60 beats per minute (page 351)
- Use of 2 thumb-encircling hands chest compression techniques is reaffirmed for 2-rescuer healthcare provider CPR (page 351)
- Relative (one third depth of chest) versus absolute depth of chest compression: compressions should be sufficiently deep to generate a palpable central pulse (page 352)
- Considerations for use of alternative advanced airway adjuncts (eg, laryngeal mask airways) by appropriately trained providers (page 350)
- Emphasis on secondary confirmation of tracheal tube placement (page 351)
- Use of crystalloids rather than colloids for initial volume resuscitation (page 352)
- Consideration of when initiation of resuscitation may be inappropriate (pages 354-355)
- Emphasis on avoidance of perinatal hyperthermia (page 348)
- Considerations for room air versus 100% oxygen supplementation during resuscitation (page 350)

1997 Text Chapter 10: Immediate Postarrest Stabilization and Secondary Transport

(ECC Guidelines 2000, pages 326-331)

Increased emphasis on postresuscitation interventions that may influence improved neurologic survival:

- Normal ventilation rather than hyperventilation in most victims (pages 326-327)

Control of temperature, avoiding hyperthermia (pages 330-331)

- * Avoidance of hyperglycemia (pages 326-331)
- Management of postischemic myocardial dysfunction using titrated pressors, inotropes, inodilators, and vasodilator medications (pages 328-329)

TABLE I PALS Medications to Maintain Cardiac Output and for Postresuscitation Stabilization

Medication	Dose Range	Comment	Preparation*
Inamrinone	IV/IO loading dose: 0.75-1.0 mg/kg IV over 5 minutes; may repeat 2 times IV/IO infusion: 5-10 ug/kg per minute	Inodilator	6 x body weight (in kg) No. of mg diluted to total 100 mL; then 1 mL/h delivers 1 ug/kg per minute
Dobutamine	IV/IO infusion: 2-20 ug/kg per minute	Inotrope; vasodilator	6 x body weight (in kg) No. of mg diluted to total 100 mL; then 1 mL/h delivers 1 ug/kg per minute
Dopamine	IV/IO infusion: 2-20 ug/kg per minute	not a: chronotrope; renal and splanchnic vasodilator in lower doses; pressor in higher doses	6 x body weight (in kg) No. of mg diluted to total 100 mL; then 1 mL/h delivers 1 ug/kg per minute
Epinephrine	IV/IO infusion: 0.1-1.0 ug/kg per minute	Inotrope; chronotrope; vasodilator in lower doses and pressor in higher doses	0.6 x body weight (in kg) No. of mg diluted to total 100 mL; then 1 mL/h delivers 0.1 ug/kg per minute
Lidocaine	IV/IO loading dose: 1 mg/kg IV/IO infusion: 20-50 ug/kg per minute	Antiarrhythmic, mild negative inotrope. Use lower infusion rate if poor cardiac output or poor hepatic function.	60 x body weight (in kg) No. of mg diluted to total 100 mL; then 1 mL/h delivers 10 ug/kg per minute or alternative premix 120 mg/100 mL at 1 to 2.5 mL/kg per hour
MILRINONE	IV/IO loading dose: 50-75 ug/kg IV/IO infusion: 0.5-0.75 ug/kg per minute	Inodilator	0.6 x body weight (in kg) No. of mg diluted to total 100 mL; then 1 mL/h delivers 0.1 ug/kg per minute
Norepinephrine	IV/IO infusion: 0.1-2.0 ug/kg per minute	Vasopressor	0.6 x body weight (in kg) = No. of mg diluted to total 100 mL; then 1 mL/h delivers 0.1 ug/kg per minute
Prostaglandin E ₁	IV/IO infusion: 0.05-0.1 ug/kg per minute	Maintains patency of ductus arteriosus in cyanotic congenital heart disease. Monitor for apnea, hypotension, and hypoglycemia.	0.3 x body weight (in kg) = No. of mg diluted to total 50 mL; then 1 mL/h delivers 0.1 ug/kg per minute
Sodium nitroprusside	IV/IO infusion: 1-8 ug/kg per minute	Vasodilator Prepare only in dextrose in water	6 x body weight (in kg) - No. of mg diluted to total 100 mL; then 1 mL/h delivers 1 ug/kg per minute

IV indicates intravenous; IO, intraosseous

• Most infusions may be calculated on the basis of the "Rule of 6" as illustrated in the table. Alternatively, a standard concentration may be used to provide more dilute or more concentrated drug solution, but then an individual dose must be calculated for each patient and each infusion rate as follows: Infusion rate (mL/h) = weight (kg) x dose (ug/kg per minute) x 60 min/h / concentration (ug/mL). Diluent may be 5% dextrose in water, 5% dextrose in half-normal saline, normal saline, or Ringer's lactate unless noted otherwise.

- Emphasis on strategies to rapidly identify and treat special resuscitation circumstances (eg, "DOPE" mnemonic) (page 326)

1997 Text Chapter 11: Ethical and Legal Aspects of CPR in Children

(ECC Guidelines 2000, pages 12-20)

The guidelines provide discussion on

- Family presence during resuscitation attempts (pages 331-332)
- Developing strategies for survivor support plans/coping with death and dying (page 332)
- Termination of resuscitative efforts (page 332)